
Human tissue-engineered colon forms from postnatal progenitor cells: an in vivo murine model.

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Public Summary:

Aim: Loss of colon reservoir function after colectomy can adversely affect patient outcomes. In previous work, human fetal intestinal cells developed epithelium without mesenchyme following implantation in mice. However, for humans, postnatal tissue would be the preferred donor source. We generated tissue-engineered colon (TEC) from postnatal human organoid units. **Materials & methods:** Organoid units were prepared from human colon waste specimens, loaded onto biodegradable scaffolds and implanted into immunocompromised mice. After 4 weeks, human TEC was harvested. Immunofluorescence staining confirmed human origin, identified differentiated epithelial cell types and verified the presence of supporting mesenchyme. **Results:** Human TEC demonstrated a simple columnar epithelium. Immunofluorescence staining demonstrated human origin and the three differentiated cell types of mature colon epithelium. Key mesenchymal components (smooth muscle, intestinal subepithelial myofibroblasts and ganglion cells) were seen. **Conclusion:** Colon can form from human progenitor cells on a scaffold in a mouse host. This proof-of-concept experiment is an important step in transitioning TEC to human therapy.

Scientific Abstract:

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